

Serial No.: 10/664,345
Docket No.: GP-302959

Amendments to the Claims

1.- 21. (Canceled).

22. (Currently Amended) A device comprising a membrane electrode assembly wherein said membrane electrode assembly comprises:

a cathode catalyst layer having a first set of edges;

an anode catalyst layer having a second set of edges; and

a solid polymer electrolyte provided between said cathode and anode catalyst layers, said solid polymer having an ionomer and a third set of edges, wherein said anode catalyst layer has a surface area in contact with said ionomer which is less than a surface area of said cathode catalyst layer in contact with said ionomer, and said first set of edges of said cathode catalyst layer are closer in proximity than said second set of edges of said anode catalyst layer to said third set of edges of said electrolyte; and

first and second diffusion layers, wherein the surface areas of said catalyst layers in contact with said ionomer are sized entirely by gaskets interposed between said electrolyte and said diffusion layers.

23. (Canceled).

24. (Previously Presented) The device as recited by claim 22 further comprising a diffusion layer, wherein the surface area of said anode catalyst layer in contact with said ionomer is sized by a gasket interposed between said electrolyte and said diffusion layer.

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25. (Previously Presented) The device as recited by claim 22 further comprising first and second diffusion layers, wherein the surface areas of said catalyst layers in contact with said ionomer are sized by gaskets interposed between said electrolyte and said diffusion layers.

26. (Previously Presented) The device as recited by claim 22 wherein said cathode catalyst layer is provided to a first diffusion layer, and said anode catalyst layer provided to a second diffusion layer.

27. (Previously Presented) The device as recited by claim 22 wherein the surface area of the cathode catalyst layer ranges from about 730 cm² to about 805 cm² and the surface area of the anode catalyst layer ranges from about 700 cm² to about 770 cm².

28. (Previously Presented) The device as recited by claim 22 wherein a difference between the surface areas of the cathode and anode catalyst layers ranges from about 32 cm² to about 36 cm².

29. (Previously Presented) The device as recited by claim 22 wherein spacing of said first set of edges of said cathode catalyst layer and said second set of edges of said anode catalyst layer to said third set of edges of said electrolyte range from about 47 mm to about 58 mm.

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30. (Previously Presented) The device as recited by claim 22 wherein the catalyst layers have thicknesses in the range of about 8 to about 10 microns.

31. (Previously Presented) The device as recited by claim 22 wherein the membrane electrode assembly has a thickness in the range of about 34 to about 41 microns.

32. (Currently Amended) The device as recited by claim 22 wherein said membrane electrode assembly is incorporated into a fuel cell comprising:

~~a first electrically conductive diffusion layer coupled to said cathode catalyst layer;~~

~~a second electrically conductive diffusion layer coupled to said anode catalyst layer; and~~

a pair of electrically conductive flow field plates sandwiching therebetween said diffusion layers, said catalyst layers, and said solid polymer electrolyte.

33. (Previously Presented) The device as recited by claim 32 wherein the surface area of the cathode catalyst layer ranges from about 730 cm² to about 805 cm² and the surface area of the anode catalyst layer ranges from about 700 cm² to about 770 cm².

34. (Previously Presented) The device as recited by claim 32 wherein a difference between the surface areas of the cathode and anode catalyst layers ranges from about 32 cm² to about 36 cm².

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35. (Previously Presented) The device as recited by claim 32 wherein said fuel cell is incorporated into a fuel cell system comprising:

a fuel storage system supplying a fuel comprising hydrogen;

a drive system;

an energy conversion component receiving and regulating generated electricity by the fuel cell system to control said drive system; and

an optional temporary energy storage for storing the generated electricity.

36. (Previously Presented) The device as recited by claim 35 wherein said fuel cell system further comprising a fuel processor for converting said fuel into a hydrogen rich stream for said fuel cell.

37. (Previously Presented) The device as recited by claim 35 wherein said device is an automobile.

38. (Currently Amended) The device as recited by claim 35 wherein said anode catalyst layer has a surface area less than a surface area of said cathode catalyst layer in contact with said solid polymer electrolyte, wherein the surface area of the cathode catalyst layer ranges from about 730 cm² to about 805 cm² and the surface area of the anode catalyst layer ranges from about 700 cm² to about 770 cm², and wherein a difference between the surface areas of the cathode and anode catalyst layers ranges from about 32 cm² to about 36 cm².

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39. (Currently Amended) A method of preparing a membrane electrode assembly comprising:

providing a solid polymer electrolyte having an ionomer, said solid polymer electrolyte having first and second surfaces;

providing a cathode catalyst layer to the first surface of said electrolyte; and

providing an anode catalyst layer to the second surface of said electrolyte such that a first set of edges of said cathode catalyst layer are closer than a second set of edges of said anode catalyst layer to a third set of edges of said electrolyte, and such that a total surface area of said anode catalyst layer is smaller than a total surface area of said

cathode catalyst layer;

providing gaskets; and

providing first and second diffusion layers, wherein the surface areas of said catalyst layers in contact with said ionomer are sized entirely by said gaskets interposed between said electrolyte and said diffusion layers.

40. (Canceled)